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SECOND ANTARCTIC VOYAGE OF THE "SCOTIA."

A very interesting account of the second year's work of the Scottish National Antarctic Expedition appears in the *Scottish Geographical Magazine* (Jan., 1905). It will be remembered that at the close of its first year's work the *Scotia* went to Buenos Aires for supplies. On January 21, 1904, the vessel left Buenos Aires for the south on her second journey to Weddell Sea. Besides her own staff, there were on board three Argentine meteorologists sent out by the Argentine Government to man the observatory in Scotia Bay, South Orkneys. These islands were reached on February 14, the Argentine party was left under the leadership of Mr. R. C. Mossman, and on February 22 the *Scotia* started for Weddell Sea.

A southeasterly course was steered to cut between the *Scotia's* two tracks of the previous year. No ice was met till near the Antarctic Circle. Early in March the *Scotia* surpassed her southern record of 1903, and also Ross's farthest south of 1843. No obstacle had been met, though in the previous year impenetrable pack was found in this region.

In $72^{\circ} 18' \text{ S.}$, $17^{\circ} 59' \text{ W.}$, a sounding of 1,131 fathoms was obtained. All the depths up to this time have been over 2,600 fathoms. At the same time land was reported ahead. A lofty ice barrier stretching northeast and southwest barred further progress to the south. Close, heavy pack prevented a nearer approach than two miles. This barrier was traced 150 miles to the southwest. In $73^{\circ} 30' \text{ S.}$, $21^{\circ} 30' \text{ W.}$, a depth of 159 fathoms was found, the ice barrier being then two and a half miles off. Early on the morning of March 7 the *Scotia* was caught in a northeast blizzard and beset in slush and heavy pack. At the end of two days the gale abated and the party found that the *Scotia* had been driven into a bight of the ice barrier. This was in $74^{\circ} 1' \text{ S.}$, $22^{\circ} 0' \text{ W.}$, and the depth here was 161 fathoms two miles from the barrier. The Expedition believed the *Scotia* might be frozen in for the season, and began to make preparations for winter. Emperor penguins were extraordinarily abundant, and many were secured for specimens, as well as for food, in case the party had to winter there. Skuas, terns, Antarctic and snowy petrels were also very abundant, and some seals were seen.

Fortunately, the pack began to break up on March 13, and soon

the *Scotia* was once more afloat and started north. The part of the Antarctic continent which the Expedition had discovered was named "Coats Land" after Mr. James Coats, Jr., and Major Andrew Coats, the two chief subscribers to the Expedition. Concerning this new land Mr. Bruce, the leader of the Expedition, says:

I have been asked by several if I am sure that this great ice barrier was really part of the Antarctic Continent. I have no hesitation in saying "Yes," and my reasons are these: All our soundings between 60° and 70° S. were 2,500 to 2,700 fathoms. In 72° S. they shoaled to about 2,300 fathoms, fifty miles from the barrier. Thirty-five miles from the barrier they shoaled to 1,400 and 1,200 fathoms, and two miles from the barrier to 160 fathoms. This alone should answer the question in the way which I have done. Secondly, from the vertical cliff of ice 100 to 150 feet in height which bordered the ocean the ice rose high inland in undulating slopes and faded away in height and distance into the sky. It was impossible to estimate the height of this field of ice—the true inland ice of Antarctica—but probably it was many thousands of feet. Thirdly, seals and birds, which up till now had been few in numbers, were seen in myriads—penguins, especially emperors, many petrels, and terns swarming in every direction—the inhabitants of the beaches and rocky cliffs of some actual land not very far distant.

It was now the end of the Antarctic summer, and the *Scotia*, therefore, turned northeast towards the "Ross Deep." The water deepened rapidly to over 2,000 fathoms, until after a few days, when a somewhat more easterly course was taken, which brought the vessel into rapidly-shoaling water. In 71° 32' S., 17° 15' W., the depth was 1,221 fathoms, which showed that the Expedition was getting to the continental shelf of Antarctica again. As pack was here met, the *Scotia* turned back to the northeast. Trawling in 1,410 fathoms in this region resulted in one of the richest hauls the party had made in Antarctic waters, no less than sixty species of animals being obtained.

On March 23 a sounding of 2,660 fathoms was obtained within one mile of Ross's reported sounding of "4,000 fathoms, no bottom"; so after 60 years this sounding, and with it the hypothetical contours of the South Atlantic based on it, have been obliterated from the map. This implies no disparagement of Ross's splendid work. His error was doubtless due to inadequate sounding apparatus and to a strong undercurrent which the *Scotia* discovered in this region.

Steaming nearly due north up to Gough Island, the expedition discovered comparatively shallow water, under 2,000 fathoms, north of 52° S. This shows an extension of the Mid-Atlantic Ridge to the south of the Tristan Da Cunha group. From 58° S. to 48° the bottom was diatom ooze and hard ground; in 46° and 41° S. samples of globigerina ooze were brought up.

The party landed on Gough Island, and found it clothed in green. Tussock grass and a small stunted tree (*Phyllica nitida*) grew in abundance, with ferns and mosses. The fauna and flora

resemble those of Tristan Da Cunha, but probably include several new species; two species of birds new to science found here are now being described. Ruins of huts were on the island, and it was afterwards learned at Cape Town that sealers had spent some months here. The *Scotia* reached Cape Town on May 5th.

The chief scientific results of the *Scotia's* voyage may be briefly summed up. Soundings and the discovery of a southern limit to the sea at Coats Land show that the Weddell Sea is less extensive both in area and depth than had been supposed. Temperature and salinity observations of the water were taken at all depths, samples of the bottom deposits were obtained, and the zoological collections embrace many birds, in addition to seals, fish, and representatives of almost every class of invertebrates, from the surface waters, from intermediate depths, and from the bottom of the ocean. Systematic plankton collections were also made.

At the South Orkneys materials were collected for a detailed map of Laurie Island, which will be published soon; an hourly meteorological record was kept for eleven months, and the record is being continued by the meteorologists stationed there; and, in addition, similar observations were taken by the *Scotia* all the time she was at sea. Magnetic observations were made, the botany and geology were investigated, and an extremely rich shallow water fauna was collected, in addition to many specimens of the seals and of the birds of the locality, with their eggs.

In the South Atlantic a somewhat deeper channel has been found between Falkland Islands and the South Orkneys than was previously supposed to exist. Farther east the ocean's contours were materially changed by the discovery of a large southern extension of the Mid-Atlantic ridge to the south of Gough Island. Physical and biological work was carried out in a hitherto entirely uninvestigated ocean; and on Gough Island a small but representative collection of the fauna, flora, and geology was made for the first time.

The report refers to the large amount of work yet to be done between the Tristan Da Cunha group and South Georgia, of island groups still unexplored, and of additional discoveries to be made of other parts of the Antarctic continent in the Weddell Sea region. The hope is expressed that the work begun by Mr. Bruce will be continued in the near future.